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EXAMINER

SAMS, MATTHEW C

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**MAILED**  
**JUN 29 2007**  
**Technology Center 2600**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/810,112  
Filing Date: March 26, 2004  
Appellant(s): FIFIELD, DAVID

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Gary W. Hamilton  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 4/9/2007 appealing from the Office action mailed 8/2/2006.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of the amendments in the brief is correct.  
No amendment after final has been filed.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US 2004/0198420	He et al.	8-2002
US 2003/0146876	Greer et al.	12-2002

## **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over He et al. (US 2004/0198420 hereafter, He) in view of Greer et al. (US 2003/0146876 hereafter, Greer).

Regarding claim 1, He teaches a communication system for providing dual band wireless communications (Fig. 1 and Page 2 [0019-0025]) comprising a first radio transceiver operable to communicate using RF signals at a first frequency, a second radio transceiver operable to communicate using RF signals at a second frequency (Page 2 [0022] and Fig. 1 [3]), and using a diversity switch (Fig. 1 [SW1 & SW2]) to connect one of the dual-band antennas with either the first or second radio transceiver. (Fig. 1 and Page 2 [0019-0025]) He teaches implementing the circuit in a laptop computer (Page 2 [0025]) using various interfaces (Page 2 [0019]), but differs from the claimed invention by not explicitly reciting a first and second "pair" of antennas, each "pair" operating at differing frequencies and implemented on a PCMCIA.

In an analogous art, Greer teaches a multiple antenna diversity for wireless local area network (WLAN) applications that includes a first pair of antenna elements, a second pair of antenna elements, a diversity switch for connecting the transceivers with the appropriate antenna pair (Page 8 Claim 17) where the antenna elements are disposed on a PCMCIA card (Page 4 [0044]) to optimize reception and transmission for the operating frequencies being implemented on a PCMCIA card. (Page 3 [0036], Page 8 Claims 18 and 19) At the time the invention was made, it would have been obvious to one of ordinary skill in the art to implement the invention of He on a PCMCIA after modifying it to incorporate the antenna diversity and selection of Greer. One of ordinary

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skill in the art would have been motivated to do this since spatial diversity and polarization diversity can improve reception performance (Greer Page 2 [0017-0020]) and would become necessary with implementation on a PCMCIA card since the antennas of He would no longer be located in different locations of the laptop as hoped for in Page 2 [0025] of He.

Regarding claim 2, He in view of Greer teaches the antenna element pairs are on the same end of the PCB but on opposite sides of the PCB. (Greer Fig. 1, Fig. 8, Fig. 9, Fig. 17, Page 2 [0019], and Pages 3-4 [0037])

Regarding claim 3, He in view of Greer teaches the circuit board comprises a ground plane disposed between the individual antenna elements on opposite sides of the circuit board. (Greer Page 4 [0044] and Page 5 [0051])

Regarding claim 4, He in view of Greer teaches the first and second elements of the first pair of antenna elements are oriented to maximize polarization diversity to optimize transmission and receptions of the RF signals. (Greer Pages 2-3 [0021])

Regarding claim 5, He in view of Greer teaches the first and second antenna elements are disposed on the circuit board with an orientation to be orthogonal with respect to each other. (Greer Page 2 [0020] and Page 6 [0059])

Regarding claim 6, He in view of Greer teaches the first and second pair of antenna elements are oriented to maximize polarization diversity to optimize transmission and reception of the RF signals. (Greer Page 2 [0020], Page 4 [0042] and Page 6 [0059])

Regarding claim 7, He in view of Greer teaches the first and second antenna elements of the second pair of antenna elements are disposed on the circuit board with an orientation that is orthogonal to each other. (Greer Page 8 Claim 14 and Claim 17)

Regarding claim 8, He in view of Greer teaches the first pair of antenna elements can operate at 2.4 GHz. (He Fig. 1 and Greer Page 2 [0014-0015])

Regarding claim 9, He in view of Greer teaches the second pair of antenna elements can operate at 5 GHz. (He Fig. 1 and Greer Page 2 [0014-0015])

Regarding claim 10, He in view of Greer teaches the circuit board contains the first and second transceiver, the diversity switch, the first and second pair of antennas, all of which are implemented in a PCMCIA module. (He Page 2 [0019] and Greer Page 3 [0036] and Page 4 [0044-0046])

Regarding claim 11, the limitations of claim 11 are rejected as being the same reason stated above in claim 1.

Regarding claim 12, the limitations of claim 12 are rejected as being the same reason stated above in claim 2.

Regarding claim 13, the limitations of claim 13 are rejected as being the same reason stated above in claim 3.

Regarding claim 14, the limitations of claim 14 are rejected as being the same reason stated above in claim 4.

Regarding claim 15, the limitations of claim 15 are rejected as being the same reason stated above in claim 5.

Regarding claim 16, the limitations of claim 16 are rejected as being the same reason stated above in claim 6.

Regarding claim 17, the limitations of claim 17 are rejected as being the same reason stated above in claim 7.

Regarding claim 18, the limitations of claim 18 are rejected as being the same reason stated above in claim 8.

Regarding claim 19, the limitations of claim 19 are rejected as being the same reason stated above in claim 9.

Regarding claim 20, the limitations of claim 20 are rejected as being the same reason stated above in claim 10.

#### **(10) Response to Argument**

With respect to the Appellant's argument pertaining to claims 1 and 11 that *the proposed combination of He and Greer does not provide all of the limitations reciting in independent claims 1 and 11* (Page 3 Para 2), the Examiner disagrees.

As the Appellant stated on Page 3 of the Appeal Brief, He teaches a dual-mode wireless transceiver for wireless local area network communication having a first and second antenna disposed at different locations on a laptop computer. (Page 2 [0025]) He also teaches the antennas (Fig. 1 [43a & 43b]) are dual band antennas that are designed for operation in the 2.4 GHz and 5 GHz frequency bands. (Page 2 [0025]) He differs from the claimed invention by not implementing the entire system (antennas, diversity switch & transceivers) on a circuit board and the use of antenna "pairs".

To alleviate the deficiencies, a combination of analogous art in Greer was proposed. Greer is directed to multiple antenna diversity in wireless local area network applications (Page 2 [0014] and Page [0040] "offering acceptable performance

parameters at the desired operating frequency or frequencies”) implemented on a PCMCIA card (Page 3 [0036] *i.e.* circuit board) for insertion into a laptop computer. (Page 4 [0044]) Greer teaches the inclusion of a switch, antennas and a controller collocated on the PCMCIA card. (Page 4 [0046]) Greer teaches an embodiment that includes a first pair of antennas having different signal polarization and a second pair of antennas having different radiation pattern characteristics for providing diversity operation. (Page 8 [Claim 17]) Greer specifically states an antenna is designed for operating at “acceptable performance parameters at the desired operating frequency or frequencies” (Page 4 [0040]), with two frequency bands of interest being 2.4 GHz (Page 2 [0012 & 0014]) and 5 GHz. (Page 2 [0014]) Therefore, the Examiner is concluding Greer’s antennas can be considered dual band antennas, analogous with He (He Page 2 [0025]) and thus operational on first and second frequencies.

The motivation for combining the references is that spatial diversity and polarization diversity can either independently or together provide improved reception performance. (Greer Page 2 [0017-0020]) When combining the teachings of He in view of Greer, the implementation of He onto a PCMCIA would decrease the physical separation of the antenna elements found within He, by making the diversity antennas more compact and portable by placing the antennas on a PCMCIA card. Greer teaches not only spatial diversity on a PCMCIA card, but an additional reception improving technique called polarization diversity. (Greer Page 2 [0017-0020] and Page 3 [0032-0036]) Further, it is noted that He already provides for the transmission and reception on first and second frequencies (He Fig. 2 [2 GHz Rx/Tx, 5 GHz Rx/Tx and 802.11 a/b RFIC]) and the combination with Greer would not lose this feature but add to it with the



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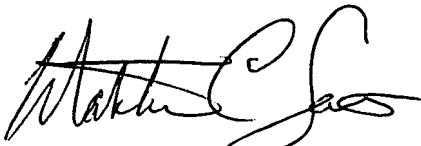
addition of antenna pairs, necessary for improving signal quality by transmission diversity. (Greer Page 8 [Claim 17] i.e. providing diversity operation)

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



Matthew C. Sams  
June 21, 2007

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